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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/805,594

03/19/2004

Michael A. Kost

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EXAMINER

SUTHERS, DOUGLAS JOHN

ART UNIT

PAPER NUMBER

2615

MAIL DATE

DELIVERY MODE

09/10/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/805,594	KOST ET AL.	
	Examiner	Art Unit	
	Douglas Suthers	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/15/04</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

1. The Art Unit location of your application in the USPTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Art Unit 2615.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:
  3. Page 10 refers to "system 100", not found in figure 1.
  4. Page 10 refers to "modulator 140", not found in figure 1.
  5. Page 14 refers to "stage 340", not found in figure 3.
6. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1, 11, 13, 14, and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Regarding claim 1, the limitation "wherein the controller is configured to provide a programmable response to the filtered sensor signals" is unclear because it could be interpreted that the response is passed along to the sensor signals. Perhaps the following is intended: "wherein the controller is configured to provide a programmable response **based on** the filtered sensor signals".

10. Claims 11, 13, 14, and 24 are rejected in an analogous manner.

***Claim Rejections - 35 USC § 102***

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 1-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Ulrick et al. (US 6498531 B1).

13. Regarding claim 1, Ulrick discloses a system comprising:

a digital amplifier controller (figure 3 and figure 1 items 100);

an amplifier output stage coupled to the controller and configured to receive audio signals from the controller (200);

one or more sensors coupled to the output stage (temperature, figure 3); and

one or more low-pass filters coupled to the one or more sensors and configured to receive sensor signals from the one or more sensors (column 9, line 2);

wherein the low-pass filters are configured to filter the sensor signals and to provide the filtered sensor signals to the controller (column 9, line 2); and

wherein the controller is configured to provide a programmable response to the filtered sensor signals (amplifier control).

14. Regarding claim 2, Ulrick discloses wherein the controller comprises a pulse width

modulation (PWM) controller (100) and the output stage comprises a PWM output stage (200);

wherein the system further comprises one or more comparators (figure 3, top right, current comparator) coupled to receive analog sensor signals from corresponding

ones of the sensors and configured to generate binary sensor signal which are provided to corresponding ones of the low-pass filters;

wherein each low-pass filter comprises an accumulator (counter and adder) configured to not assert the filtered sensor signal when a value in the accumulator is below a programmable threshold and to assert the filtered sensor signal when the value in the accumulator is above the threshold (set by 57);

wherein the one or more sensors comprise at least one current sensor (top of figure 4) and at least one temperature sensor (bottom of figure 3), and

wherein the controller is configured to detect over-current and over-temperature conditions in the output stage (figure 3); and

wherein the programmable response to the filtered sensor signals is selected from the group of responses consisting of: shutting down the output stage (column 8 line 59); and compressing at least a portion of the audio signals.

15. Regarding claim 3, Ulrick discloses wherein the controller comprises a pulse width modulation (PWM) controller (100) and the output stage comprises a PWM output stage (200).

16. Regarding claim 4, Ulrick discloses wherein the one or more sensors comprise at least one current sensor (top of figure 3), wherein the controller is configured to detect shoot-through current (over current) and to responsively adjust delays between a high-

side signal and a low-side signal (delays driving drivers until system is ok) to minimize the shoot-through current.

17. Regarding claim 5, Ulrick discloses further comprising one or more comparators (figure 3), wherein each comparator is coupled to receive an analog sensor signal from a corresponding one of the sensors and to generate a binary sensor signal (before AND gates) which is provided to a corresponding one of the low-pass filters.

18. Regarding claim 6, Ulrick discloses wherein the one or more sensors comprise at least one current sensor (top of figure 3).

19. Regarding claim 7, Ulrick discloses wherein the one or more sensors comprise at least one temperature sensor (bottom of figure 3).

20. Regarding claim 8, Ulrick discloses wherein the low-pass filters comprise accumulators (figure 3, adders).

21. Regarding claim 9, Ulrick discloses wherein the filtered sensor signal corresponding to each accumulator is not asserted when a value in the accumulator is below a threshold (set via 52 and 57) and is asserted when the value in the accumulator is above the threshold.

22. Regarding claim 10, Ulrick discloses wherein the threshold is programmable (dips 52 and 57).

23. Regarding claim 11, Ulrick discloses wherein the controller is configured to receive filtered sensor signals from multiple sensors and to provide responses to each of the filtered sensor signals (figure 3).

24. Regarding claim 12, Ulrick discloses wherein the multiple sensors comprise at least one current sensor (top of figure 3) and at least one temperature sensor (bottom of figure 3), and wherein the controller is configured to detect over-current and over-temperature conditions in the output stage (figure 3).

25. Regarding claim 13, Ulrick discloses wherein the programmable response to the filtered sensor signals is selected from the group of responses consisting of: shutting down the output stage (column 8 line 59); and compressing at least a portion of the audio signals.

26. Regarding claim 14, Ulrick discloses a method comprising:  
sensing a condition of an audio amplifier output stage (current, temperature);  
providing a sensor output signal corresponding to the sensed condition (figure 3);  
low-pass filtering the sensor output signal to produce a filtered sensor signal  
(column 9, line 2);



providing the filtered sensor signal to an audio amplifier controller (figure 1 item 100, and figure 3); and

providing a programmable response to the filtered sensor signal (amplifier control).

27. Regarding claim 15, Ulrick discloses wherein the audio amplifier output stage comprises a pulse width modulated (PWM) output stage (200) and wherein sensing the condition of the output stage comprises detecting a current (top of figure 3) through a transistor of the output stage.

28. Regarding claim 16, Ulrick discloses further comprising detecting a shoot-through condition in the output stage (over current, top of figure 3).

29. Regarding claim 17, Ulrick discloses further comprising adjusting relative delays between a high-side signal and a low-side signal input to the output stage to minimize shoot-through (delays driving drivers until system is ok).

30. Regarding claim 18, Ulrick discloses wherein the audio amplifier output stage comprises a pulse width modulated (PWM) output stage (200) and wherein sensing the condition of the output stage comprises detecting a temperature (bottom of figure 3) of a transistor of the output stage.

31. Regarding claim 19, Ulrick discloses wherein the audio amplifier output stage comprises a pulse width modulated (PWM) output stage (200) and wherein sensing the condition of the output stage comprises detecting a temperature of a heat sink of the output stage (bottom of figure 3).

32. Regarding claim 20, Ulrick discloses wherein providing a sensor output signal corresponding to the sensed condition comprises sensing a voltage corresponding to the sensed condition (bottom of figure 3), comparing the voltage to a reference value and generating a binary signal based upon the comparison (from comparator).

33. Regarding claim 21, Ulrick discloses wherein low-pass filtering the sensor output signal comprises incrementing and/or decrementing an accumulator (adders of figure 3) based upon the binary signal and generating a signal indicative of whether a value in the accumulator is above or below a threshold value (52) associated with the accumulator.

34. Regarding claim 22, Ulrick discloses further comprising modifying the threshold value associated with the accumulator (via dips 52 and 57).

35. Regarding claim 23, Ulrick discloses further comprising processing filtered sensor signals corresponding to multiple sensors through common logic in the controller (figure 3).

36. Regarding claim 24, Ulrick discloses wherein providing the programmable response to the filtered sensor signal is selected from the group consisting of: shutting down the output stage; and compressing at least a portion of the audio signals.

**Conclusion**

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas Suthers whose telephone number is (571)272-0563. The examiner can normally be reached on 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571)272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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